

REMARKS

This is in response to the Office Action mailed on October 8, 2004.

Claims 28, 29, 32, 39, 41, 42, 44-48, 51, 52, 57-60, 65, 66, 69, 70, 73-78 are amended, claims 6, 15, 34, 37, and 72 are canceled without prejudice or disclaimer, and no claims are added; as a result, claims 2-5, 8-10, 12-14, 18-20, 28, 29, 32, 35, 36, 39-71, and 73-78 are now pending in this application. The amendments to the claims are fully supported by the specification as originally filed. No new matter is introduced. Applicant respectfully requests reconsideration of the above-identified application in view of the amendments above and the remarks that follow.

Claims 28, 29, 32, 45, 47, 51, 57, 59, 65, 69, 73, 75, and 77 are amended to include features from dependent claims 15, 6, 37, 46, 48, 52, 58, 60, 66, 70, 74, 76, and 78, respectively.

Double Patenting Rejection

Claims 2-6, 8-10, 12-15, 18-20, 28, 29, 32, 34-37, and 39-78 were rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-53 of U.S. Patent No. 6,031,263.

Claims 2-5, 9, 10, 12-14, 20, 28, 32, 34-36, 40, 45, 47, 49, 51, 57, 59, 65, 69, 72, 73, 75, and 77 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claims 36-39, 59-61, 71-85, 98, and 99 of U.S. Application No. 09/691,004.

Claims 2-5, 9, 10, 12-14, 20, 28, 32, 34-36, 40, 45, 47, 49, 51, 57, 59, 65, 69, 72, 73, 75, and 77 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-5, 8-15, 22, 24-29, 31-35, 37-48, 50-53, and 55-57 of U.S. Application No. 08/903,486.

Claims 2-5, 9, 10, 12-14, 20, 28, 32, 34-36, 40, 45, 47, 49, 51, 57, 59, 65, 69, 72, 73, 75, and 77 were rejected under the judicially created doctrine of obviousness-type double patenting over claims 10-31 of U.S. Patent 5,886,368.

Claims 2-6, 8-10, 12-15, 18-20, 28, 29, 32, 34-37, and 39-78 were rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-37 of U.S. Patent No. 6,249,020.

Applicant will address these rejections when the claims are otherwise indicated as allowable.

§102 Rejection of the Claims

Claim 72 was rejected under 35 USC § 102(e) as being anticipated by Tanaka et al. (U.S. 5,546,351).

Claim 72 is canceled without prejudice or disclaimer. Therefore, the rejections of claim 72 are moot.

First §103 Rejection of the Claims

Claims 2-5, 9, 10, 12-14, 20, 28, 29, 32, 34-36, 40, 45, 51, 57, 65, 73, 75, and 77 were rejected under 35 USC § 103(a) as being unpatentable over Aoyama et al. (U.S. 4,507,673) in view of Nakajima et al. (U.S. 5,614,748). Applicant traverses these rejections of the claims.

Applicant cannot find in the combination of Aoyama et al. (hereafter Aoyama) and Nakajima et al. (hereafter Nakajima) a teaching or suggestion of a floating gate separated from a channel region by an insulator, where the insulator has a larger electron affinity than silicon dioxide, as recited in claim 28. Thus, Applicant submits that the combination of Aoyama and Nakajima do not teach or suggest all the elements of claim 28 and that claim 28 is patentable over Aoyama in view of Nakajima.

Applicant submits that independent claims 29, 32, 45, 51, 57, 65, 73, 75, and 77 are patentable over Aoyama in view of Nakajima for at least the reasons stated above for claim 28. Further, Applicant submits that the claims dependent on independent claims 28, 29, 32, 45, 51, 57, 65, 73, 75, and 77 are patentable over Aoyama in view of Nakajima for at least the reasons stated above.

Applicant respectfully requests withdrawal of these rejections of claims 2-5, 9, 10, 12-14, 20, 28, 29, 32, 34-36, 40, 45, 51, 57, 65, 73, 75, and 77, and reconsideration and allowance of these claims.

Second §103 Rejection of the Claims

Claims 45, 59, and 69 were rejected under 35 USC § 103(a) as being unpatentable over Aoyama et al. (U.S. 4,507,673) in view of Nakajima et al. (U.S. 5,614,748) and Miyawaki (U.S. 6,324,101). Applicant traverses these rejections of the claims.

Applicant reserves the right to swear behind Miyawaki at a later date.

Applicant cannot find in the combination of Aoyama, Nakajima, and Miyawaki a teaching or suggestion of a floating gate separated from a channel region by an insulator, where the floating gate comprises a material that has a smaller electron affinity than polycrystalline silicon and a barrier energy between the floating gate and the insulator being less than approximately 3.3 eV, where the insulator has a larger electron affinity than silicon dioxide, as recited in claim 59. Miyawaki, at column 8, lines 64 - column 9, line 5, recites:

A gate insulating layer 59 for the p-type MOSFETs preferably consists of: a combination of a nitride film, and a thermal oxide film of Si or an oxide film formed by Lp-CVD to achieve a large capacity; a thermal oxynitride film formed in an atmosphere of O.sub.2, NH.sub.3, and N.sub.2 O; Ta.sub.2 O.sub.5 with a high dielectric constant; or the like. In this embodiment, a 100-Å thick film with an effective dielectric constant of 5 was formed by combining an oxide film and a nitride film, and was used as the insulating film.

However, in Miyawaki, a poly-silicon floating gate is formed on the gate insulating layer. Applicant cannot find a teaching or suggestion that the Miyawaki poly-silicon gate has a smaller electron affinity than polycrystalline silicon.

Aoyama, Nakajima, and Miyawaki being in the same field of endeavor does not *per se* provide that the references can be combined to establish a proper *prima facie* case of obviousness. In the Office Action, it is stated that “[t]he motivation for doing so, as is taught by Miyawaki, is that such structure provides a more stable write operation (col. 8, lines 34-35).” This quote is with respect to the application of Miyawaki to a feature in claim 59 regarding an area of a capacitor formed by a control gate, a floating gate, and an intergate dielectric in relation to an area of a capacitor formed by the floating gate, an insulator, and a channel region. Applicant cannot find a motivation in the cited references to combine the references with respect to the floating gate and insulator as recited in claim 59. Thus, Applicant submits that claim 59 is patentable over Aoyama in view of Nakajima and Miyawaki. For at least reasons similar to those stated

above, claims 45 and 69 are patentable over Aoyama in view of Nakajima and Miyawaki.

Further, claim 59 recites “an area of a capacitor formed by the control gate, the floating gate, and the intergate dielectric is larger than an area of a capacitor formed by the floating gate, the insulator, and the channel region.” In the Office Action, Miyawaki Fig. 5A is referenced with respect to the relative capacitors. On reviewing Fig. 5A, Fig. 5B, column 8, lines 60-63 of Miyawaki, Applicant respectfully submits that Fig. 5A and Fig. 5B indicate an area of a capacitor formed by the control gate, the floating gate, and the intergate dielectric is smaller than an area of a capacitor formed by the floating gate, the insulator, and the channel region in the Miyawaki structure. Thus, the combination (though not proper) does not teach or suggest all the elements of claim 59. For similar reasons, the combination (though not proper) does not teach or suggest all the elements of claim 69. For these additional reasons, Applicant submits that claims 59 and 69 are patentable Aoyama in view of Nakajima and Miyawaki.

Applicant respectfully requests withdrawal of these rejections of claims 45, 59, and 69, and reconsideration and allowance of these claims.

Third §103 Rejection of the Claims

Claim 71 was rejected under 35 USC § 103(a) as being unpatentable over Aoyama et al. (U.S. 4,507,673) in view of Nakajima et al. (U.S. 5,614,748) as applied to claim 32 above, and further in view of Tanaka et al. (U.S. 5,546,351). Applicant traverses these rejections of the claims.

The combination of Tanaka et al. (hereafter Tanaka) with Aoyama and Nakajima does not cure the deficiencies of citing Aoyama and Nakajima with respect to claim 32. Therefore, Applicant submits that claim 32 is patentable over Aoyama in view of Nakajima further in view of Tanaka. Claim 71 depends from claim 32 and is patentable over Aoyama in view of Nakajima further in view of Tanaka for at least the reasons stated above.

Applicant respectfully requests withdrawal of these rejections of claim 71, and reconsideration and allowance of this claim.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 371-2157 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

LEONARD FORBES ET AL.

By their Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. Box 2938
Minneapolis, MN 55402
(612) 371-2157

Date 10 January 2005 By David R. Cochran
David R. Cochran
Reg. No. 46,632

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: MS Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 10 day of January, 2005.

Tina Kohut
Name

ZUH
Signature